FISH HABITAT AND DREDGING

Fish habitat means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes . . . No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.

Fisheries Act, Section 31

Introduction

Our understanding of the significance of fish habitat as the foundation of Canada's important commercial, recreational and native fishery resources has increased dramatically in recent years. The relationships between fish and fish habitat are complex, and may be easily disrupted. Unlike our forests, wildlife and farmlands, our fish and fish habitat assets are, for the most part, hidden beneath the waters of our streams, lakes, estuaries and oceans.

When fish habitat has been polluted, altered or destroyed, the damage may not always be visible. However, the repercussions can be significant. Destruction of important fish habitat can create unemployment for fishermen, lost fishing opportunities, closed fisheries, shortages for consumers and large

public costs associated with the restoration of the damaged fishery and fish habitat.

Fish are a traditionally valuable resource and fishing is a way of life for many Canadians. Commercial and sport fisheries contribute more than $3 billion annually to the national economy in 1982 dollars and fish is a staple food and an important cultural element for many native communities. This important resource must be preserved and enhanced for future generations.

To maintain and enhance the flow of social and monetary benefits from Canada's fisheries, it is essential to protect and improve existing fish habitat and restore habitat previously altered or destroyed. The public and industrial proponents can assist in this endeavour by increasing their awareness and understanding of the unique importance of fish habitat.

Dredging

Over the centuries, coastal waters, lakes and rivers have served as highways and harbours for cargo ships. As the size of ships increased, many of the waterways proved too narrow and the harbours too shallow. Through dredging, many shipping channels have been widened and ports deepened to enable larger cargo ships to enter. In many rivers and estuaries, dredging is required on a regular basis to remove sediments which have been transported from upstream areas. Dredging is also carried out in association with developments such as the construction of marinas, which require the removal of sediments or other settled material.

Types of Dredging

The size and location of the dredging project as well as dredge availability determine which one of the four commonly used dredging methods is chosen. Mechanical dredges (the clamshell and the scraper) are used to remove gravel

or other material such as wood debris from shallow waters. The dredged material, called spoil, is loaded on barges and dumped on shore or hauled to deep-water dump sites. Hydraulically powered dredges (the cutter suction pipeline dredge and the trailing suction hopper dredge) are used in larger operations. These dredges can pump mud, fine silt, sand, clay, gravel and rock from the bottoms of marine and freshwater harbours, lakes and rivers. Both are equipped with floating pipelines. The spoil can be pumped either through a pipeline to a suitable dump site, often an intertidal area, or can be loaded on "shoulders" of the barge and dumped near the dredging operation. The hopper dredge is a sea-going vessel that can carry spoil in its hold to a deep-water dump site.

Impacts on Fish and Fish Habitat

Dredging may be valuable and necessary, but it also can be an instrument of harm, particularly where operations are conducted near fishing zones or fish habitat. The physical and chemical effects of dredging may lead to the depletion of surrounding fish stocks, damage to fish habitat and disruption of traditional fishing grounds.

Physical Effects

Fish, aquatic vegetation and other aquatic organisms can be smothered if they become buried in spoil at dump sites. Increased levels of suspended sediments in dredging and dumping areas also can have adverse effects on fish and fish food organisms. Fish may avoid migration routes and spawning and rearing grounds when dredging and dumping operations increase water turbidity (murky clouds of water and mud). Turbidity also may reduce photosynthesis in phytoplankton and aquatic plants. Valuable spawning and rearing grounds in rivers and estuaries can be destroyed or damaged by improperly planned dredging and dumping activities.

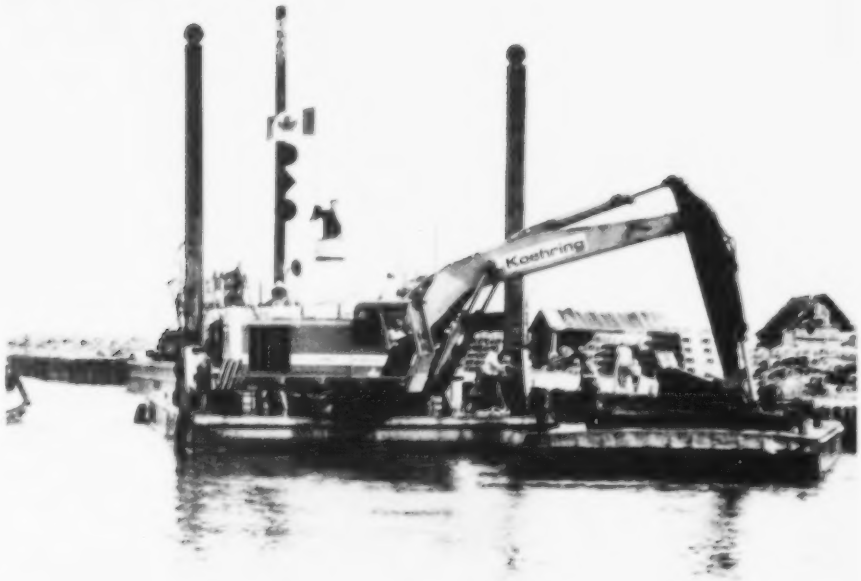
Chemical Effects

The chemical effects of dredging and dumping can be serious for fish and fish habitat. Dissolved oxygen levels in the water may become too low to support life when decomposed organic materials are disturbed through dredging or dumping. This is especially true when wood wastes are dredged. Organic materials, such as wood waste, decompose with the aid of large quantities of oxygen. This decomposition can result in the production of hydrogen sulfide which, in high concentrations, is toxic to aquatic organisms. Another concern, commonly associated with oxygen depletion in freshwater dredging operations, is the release of the nutrients, phosphorus and nitrogen. Both are found in the sediments of nutrient-rich lakes fed by run-off from agricultural lands and sewage wastes.

Both marine and freshwater dredging operations can result in the release of potentially lethal industrial contaminants such as heavy metals (zinc, lead, mercury) and organic chemicals such as PCB's and chlorophenols. The impact can range from death of fish and food organisms to subtle changes in behaviour. For example, certain species of fish, such as the Atlantic herring, may alter their migration routes. The reproductive success of other species may be reduced if they do not avoid contaminated areas. Many of these contaminants, including some pesticides, can remain in the environment for extended periods of time and can be accumulated, through food sources and water, in fish tissues. Certain contaminants can be released into the bloodstream during periods of stress, resulting in the death of the fish. So-called sublethal concentrations can damage internal organs or induce abnormal behaviour such as irregular swimming patterns which can impede migration.

Safeguards

To reduce the negative effects,



dredging and dumping operations should not be conducted during periods when fish are migrating or spawning, unless strict controls are implemented. Dump sites should be located away from fish habitat, fish rearing and fishing areas, preferably in deep-water areas. Where this is not feasible, alternative disposal methods should be selected such as land disposal of contaminated spoils in secure landfills. Depending on the nature of the spoil, it may be converted for use in the manufacture of concrete, or for other construction purposes such as artificial islands and landfill.

The Role of the Department of Fisheries and Oceans

Like farmland and forests, our fish habitats are national assets. They are contributors to the wealth of our nation and to the quality of our lives. The objective of the Department of Fisheries and Oceans Fish Habitat Management Program is to conserve, restore and develop fish habitats to maintain and improve the production of Canada's fisheries resources for the benefit of present and future generations. To realize this objective, strict controls on activities and substances which threaten fish and fish habitat are necessary.

Canada's **Fisheries Act** provides the Minister of Fisheries and Oceans with the authority to protect fish and fish habitat. The department's role includes enforcement, regulation, inspection, monitoring and research. In meeting its goal of protecting fish habitat, the department applies the principle of NO NET LOSS to new works and undertakings to ensure that habitat productive capacity is maintained. In addition, efforts are made to restore previously altered or destroyed habitat and to develop new habitat for a NET GAIN of habitats for selected fisheries.

The disposal of dredge spoil in coastal waters is controlled by the **Ocean Dumping Control Act**, administered by Environment Canada. Ocean dumping permits must be obtained before spoil is dumped at sea. Permit applications are carefully reviewed by government agencies, including the Department of Fisheries and Oceans, to ensure that the spoil is not excessively contaminated and that its disposal will not damage fish, fish habitat or fishing activities. Close cooperation between the individuals involved with dredging and fish habitat mangement officials can prevent or reduce damage to Canada's fisheries from dredging operations. An informed public can help preserve fish and fish habitat in concert with properly conducted dredging.

This brochure is one in a series prepared by the Department of Fisheries and Oceans to inform the public and interested parties about the impacts of various human activities on Canada's fish habitat.

Others in this series:

Fish Habitat and Forestry
Fish Habitat and Mining

Other habitat management leaflets available on request:

Fish Habitat, The Foundation of Canada's Fisheries
Fish Habitat, Conserving Our Hidden Assets
Canada's Fish Habitat Law
Offshore Oil and Gas and Canada's East Coast Fisheries
Acid Rain and Fisheries

For further information about fish habitat protection, please contact these departmental offices:

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Provincial Fisheries Contacts:

In Alberta, Saskatchewan, Manitoba, Ontario and the inland waters of Quebec, where the federal **Fisheries Act** is administered by the provincial government, contact the appropriate provincial fisheries management agency.

In British Columbia, in areas where only freshwater fish species are found, contact the provincial Department of Environment.

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